

## SOME NEW FLEAS (SIPHONAPTERA) OF WESTERN UNITED STATES<sup>1</sup>

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Late in 1942 many ectoparasites were collected by research staff members of the Allan Hancock Foundation, University of Southern California. Among these were several fleas which under re-evaluation disclosed a need for added study. During this study some of the fleas were found to be incorrectly identified and are here properly described as new species.

### *Hystrichopsylla hubbardi* n. sp.

Holotype Male

Head: Clypeal tubercle present, located just above ventral angle of frons. Pre-antennal region with two rows of large bristles

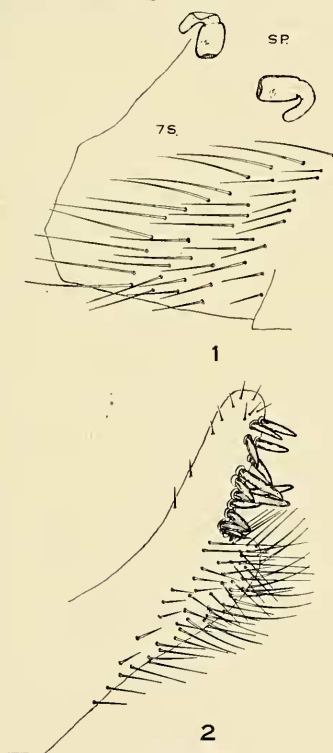


PLATE 22

Fig. 1. *Hystrichopsylla hubbardi* Aug., sternum seven, allotype female.

Fig. 2. *Hystrichopsylla hubbardi* Aug., posterior portion sternum eight, holotype male.

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and many small bristles scattered from below first row to genal ctenidium; first row of nine to ten medium bristles; second row of four large bristles, of which the bristle near the antennal fossa is misplaced somewhat above. Postantennal region with two rows of bristles in addition to the posterior marginal row; first row of seven medium bristles; second row with two large bristles near antennal fossa in addition to six medium bristles; one bristle between first and second row; posterior row of ten large bristles; a scattered number of small bristles along posterior margin of antennal fossa. Second antennal segment with marginal bristles reaching only to fourth segment of club. Genal ctenidium of six slender, subequal spines. Genal process well defined, rounded posteriorly, with ventral margin extending ventrally almost length of first ctenidial spine. Eye vestigial. Labial palpi five segmented, extending almost full length of fore coxæ. Maxillary lobe sharply acuminate. Maxillary palpi thin and rather densely covered with small bristles.

Thorax: Pronotum with three rows of bristles; first row with five medium bristles; second row with seven medium bristles; third row with ten large bristles; ctenidium with sixteen slender, equal spines on a side. Mesonotum with five to six rows of bristles, the first three rows incomplete; marginal row of six large bristles on a side. Mesepisternum with twenty-four to twenty-six small to large bristles on a side in posterior one half only. Mesepimere with many large to small, scattered bristles. Metanotum with six to seven rows of bristles, the anterior three to four rows incomplete; posterior marginal row of six large bristles on a side. Lateral metanotal area distinct, with nine medium to large bristles. Metepisternum with a single large bristle in dorsal region. Metepimere with twenty-six to twenty-eight medium to large bristles arranged in the dorsal two-thirds region.

Legs: Procoxa densely covered with large bristles over entire lateral surface. Mid and hindcoxae with bristles only on the anterior margins. Hindcoxa inner surface without patch of spiniforms. Apical bristles on hind tarsi short, none exceeding length of next segment; fifth hind tarsal segment with five lateral planter bristles.

Abdomen: Sternum one with very faint striarium. Terga one to seven with four rows of bristles, the first two rows in each irregular. Terga one to three with a false comb; five teeth on tergum one; two on tergum two; one on tergum three. Four antepygidial bristles; first uppermost the shortest, one-half length of the second, two-thirds of the third, four-fifths length of lowermost.

Modified Abdominal Segments: Eighth tergum greatly reduced, not covering any portion of the genitalia, barely reaching ventrally to the level of the proximal arm of sternum nine. Immobile process of clasper large, apex without bristles; about nine large bristles submarginal, with an equal number of small bristles

below; several small median dorsomarginal bristles; nine medium bristles on the lower two-thirds of the caudal margin; two small bristles on the margin above; acetabular bristle not differentiated. Manubrium broadly blade-like, with patch of very small bristles on the posterior ventral angle. Finger conspicuous, slender; anterior and posterior margins equally curved, broadest in the middle; a row of fourteen to sixteen large to small, posterior submarginal bristles; six small bristles on posterior apical margin. Distal arm of sternum nine conspicuous, of uniform width; anterior marginal half sclerotized lengthwise, hood-shaped with several small bristles at apex; posterior marginal half lengthwise weakly sclerotized, bearing two rows of stout, irregularly arranged spiniforms, about ten spiniforms in a row. Caudal portion of eighth sternum (Fig. 2) diagnostic, produced into a double lobe, the lower shorter, evenly rounded with many medium bristles, the upper lobe longer, narrow, bearing ten to eleven irregular, stout spiniforms on the posterior margin. Crochets of aedeagus an inconspicuous structure not as broad as apical width of aedeagus.

Length: 6.3 m.m.

#### Allotype Female

Head: First preantennal row of eight to nine bristles; rest of head as in male.

Thorax and Legs: As in male.

Abdomen: Terga one to three with false comb; nine teeth on tergum one, two each on terga two and three. Four antepygial bristles; two outer bristles sub-equal, four-fifths length of two sub-equal inner two bristles.

Modified Abdominal Segments: Anal stylet about four times as long as broad, with apical bristle rather short, only half again longer than stylet; two minute sub-apical bristles. Ventral anal lobe with ventral proximal angle nearly straight, densely covered with bristles. Tergum eight with caudal margin bilobed; inner surface with a patch of short bristles near caudal margin of ventral lobe; outer surface with a single large bristle between lobes, submarginate; several medium to large bristles covering ventral anterior portion of tergum. Caudal margin of sternum seven (7S.) diagnostic; flat, with dorsal caudal lobe sharply rounded, ventral caudal lobe, truncate; first row of twelve large bristles, many scattered, medium bristles anterior to first row. Two equal spermatheca, the head and tail of each sub-equal, not distinctly demarcated:

Length: 8 m.m.

Holotype Male: Ex Mountain Beaver, *Aplodontia rufa pacifica*. Collected by F. C. Ziesennehenne, August 25, 1942; Coos Head Park,

Coos County, Oregon. Deposited in the Allan Hancock Foundation, University of Southern California, Los Angeles, California.

Allotype Female: Collected as above, July 10, 1942. Deposited as above.

Remarks: As in *Hystrihopsylla spinata* Holland, males of *H. hubbardi* are readily separated from other members of the genus by presence of spiniform bristles on the apical portion of sternum eight. This structure also differentiates *H. hubbardi* from *H. spinati* as the latter is not bilobed. Females are difficult to differentiate, the flat caudal margin in sternum seven with truncate ventral lobe in *H. hubbardi* is quite diagnostic. The writer takes pleasure in naming this species in honor of Dr. C. Andreson Hubbard of Oregon whose work on Western Siphonaptera will be unmatched for some time to come.

### **Megarthroglossus muiri** n. sp.

#### Holotype Male

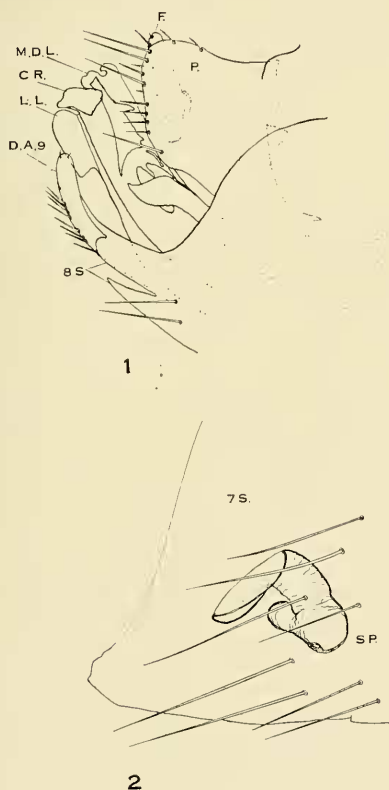
Head: Clypeal tubercle present, midway on frontoclypeal margin. First preantennal row of bristles weakly represented by three small bristles near antennal fossa and two minute bristles toward margin; second row of two large and two small bristles, alternate, with small bristle nearest antennal fossa. Genal process weakly sclerotized from vestigial eye to apex. Second segment of antennæ with short marginal bristles not reaching beyond first segment of club. Postantennal region with small anterior dorsal bristle, and larger posterior ventral bristles; posterior marginal row of one large median bristle, and two small dorsal bristles. Maxillary lobe blunt, reaching only to apex of second segment of maxillary palpi. Labial palpi long, distal half of fifth segment extending beyond forecoxa.

Thorax: Pronotum with five bristles on a side, the ventral-most much longer than the above. Pronotal ctenidium of eleven, short narrow spines. Mesonotum with three medium bristles on a side. Mesepisternum with two small bristles near anterior margin. Mesepimere without bristles, posterior margin not clearly demarcated. Metanotum with three medium bristles on a side. Lateral metanotal area weakly developed ventrally but with well demarcated dorsal ridge, a single medium bristle. Metepisternum one-third as broad dorsally as ventrally, with a single medium bristle. Bristles lacking on metepimere. Pleural arch absent.

Legs: Procoxæ with three small lateral outside bristles; anterior margin with five small bristles. Hindcoxa without patch of spiniforms on inner surface. Apex on hind tarsal segment two with single bristle extending slightly beyond apex of fifth tarsal segment. Five pairs of lateral plantar bristles, the first pair displaced medially.

Abdomen: Sternum one with well defined striarium. Terga with typical one row of bristles. False comb on tergum two of two teeth. One large antepygial bristle between two very small, equal bristles.

Modified Abdominal Segments: Eighth tergum reduced, not covering any portion of genitalia. Eighth sternum (8S.) diagnostic, with ventral caudal angle acuminate, and a middle lobe above ensheathing two-thirds of the distal arm of sternum nine. Distal arm of sternum nine (D.A.9.) narrow, of equal width from base to apex; two to three minute bristles at apex; seven to eight medium bristles on posterior median margin. Immobile process (P.) large, apex evenly rounded; ventral caudal angle broadly rounded; caudal margin with three large bristles in apical half; four to five smaller bristles between; a medium acetabular bristle.



## PLATE 23

Fig. 1. *Megarthroglossus muiri* Aug., genitalia, holotype male.

Fig. 2. *Megarthroglossus muiri* Aug., sternum seven, allotype female.

Manubrium short, sharply acuminate. Finger (F.) narrow, base slightly broader than apex, which is weakly sclerotized and extends only slightly above apex of immovable process; three to four small bristles along dorsal posterior margin. Crochets (CR.) of ædeagus small, apex weakly sclerotized, base flat, box-like. Lateral (L.L.) and middle dorsal lobes (M.D.L.) of ædeagus conspicuous.

#### Allotype Female

Head: Genal process well rounded. Fifth segment of labial palpi extended two-thirds length beyond distal end of forecoxæ. Rest of head as in male.

Thorax: Mesonotum with four medium bristles on a side. Mesepisternum with four small bristles, three on anterior margin, one medial. Mesepimere with two medium bristles on ventral margin. Metanotum with four medium bristles on a side. Rest of thorax as in male.

Legs: Procoxæ with five small bristles on lateral, outside surface. Rest of legs as in male.

Abdomen: Tergum two with false comb of one tooth and tergum three with one. Three antepygidial bristles, middle one-fourth longer than uppermost and one-fifth longer than lowermost.

Modified Abdominal Segments: Sternum seven (7S.) without sinus in caudal margin; the ventral caudal angle slightly truncate below, to knob-like protuberance above; dorsal caudal angle evenly rounded; five large bristles in posterior row preceded by three smaller bristles. Tergum eight quite large, the dorsal posterior portion covers the sensillum and anal stylet; a small rounded medial posterior angle; ventral posterior margin with four large bristles, preceded by eighteen to nineteen large, scattered bristles. Anal stylt only slightly longer than broad, with single, long apical bristle and sub-apical ventral, small bristle. Ventral anal lobe not angulate, but well demarcated. Spermatheca (SP.) with head and tail sub-equal in width; the tail curved at a right angle and more than twice the length of the head.

Holotype Male: Ex Chickaree, *Tamiasciurus douglasi albolimbatus*. Collected by writer August 25, 1941; at Tulley's Hole, N.E. Fresno County, California. Deposited in the Allan Hancock Foundation, University of Southern California, Los Angeles, California.

Allotype: Ex Shrew, *Sorex palustris navigator*. Collected as above, August 24, 1941; deposited as above.

Paratypes: One male collected with allotype. One male, one female, ex *Ochotona Schisticeps muiri*, August 22, 1941, Duck Pass, Mono County, California; three females ex *Ochotona schisticeps muiri*, August 23, 1941, Tulley's Hole, N.E. Fresno County; all collected and retained by writer.

Remarks: The unusual posterior extension of sternum eight in males separates this species, as it does in *M. becki* Tipton and Allred, from other members of the genus. The very short anal stylet in females sets *M. miuri* off from other species of the genus. This new special bears the name of that great western naturalist, John Muir.

**Megarthroglossus divisus sierræ n. ssp.**

Holotype Male

Immovable process (P.) broad as in *M. divisus divisus*; dorsal caudal angle somewhat sharper, rounded. Finger (F.) distinct, with apex narrow; widest at dorsal two-thirds line. Distal arm of

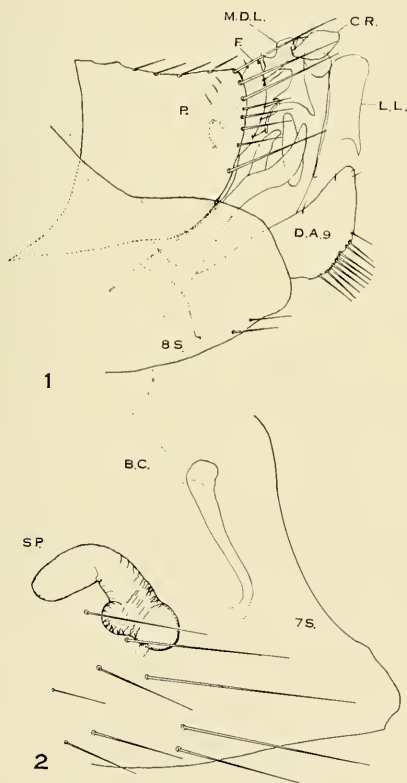


PLATE 24

Fig. 1. *Megarthroglossus divisus sierræ* Aug., genitalia, holotype male.

Fig. 2. *Megarthroglossus d. sierræ* Aug., sternum seven, allotype female.

sternum nine (D.A.9) with upper margin curved slightly dorsally instead of ventrally; lower margin deeply curved inward below typical, medial cluster of bristles. Ventral caudal angle of sternum eight (8S.) diagnostic, with extreme margin slightly flat, ventral angle blunt, dorsal angle evenly rounded.

#### Allotype Female

Caudal margin of sternum seven (7S.) without a distinct sinus, upper lobe small, lower slightly indented; five large bristles in posterior row preceded by four scattered, smaller bristles. Bursa copulatrix (B.C.) distinct, lower end vermiform, upper portion broader and funnel-shaped. Spermatheca (SP.) with tail broad at union with head.

Holotype Male: Ex Cony, *Ochotona schisticeps muiri*. Collected by writer, August 27, 1941; Cascade Valley, N.E. Fresno County, California. Deposited in the Allan Hancock Foundation, University of Southern California, Los Angeles, California.

Allotype Female: Ex Chickaree, *Tamiasciurus douglasi albolimbatus*. Collected by writer July 31, 1939; Mammoth Lakes, Mono County, California. Deposited as above.

Paratypes: Six females, one male collected with allotype. Three males collected with holotype. Retained in the writer's collection.

Remarks: As indicated, morphological details of the modified abdominal segments of both males and females are sufficiently different in this new subspecies to distinguish it from those of *M. d. divisus* (Baker).

#### SUMMARY

Three new western fleas are described and figured; *Hystri-chopsylla hubbardi* new species; *Megarhroglossus muiri* new species; *Megarhroglossus divisus sierræ* new subspecies.